

A LIFE STORY

Scientist pioneered earthquake engineering with 'soft ride' idea

Ivan Skinner, earthquake scientist: b August 30, 1923; m Patricia Main, 2s, 4d; d July 19, 2014, aged 90.

IVAN SKINNER, the father of earthquake engineering in New Zealand, was an eminent scientist who masterminded the idea of "base isolation" to protect buildings and bridges against earthquakes.

In 1993, he co-authored the original book on seismic isolation. It became an international bestseller in its field and has been translated into Chinese and Japanese.

In the late 1960s Skinner, as leader of the Department of Science and Industrial Research's Engineering Seismology Section, came up with "base isolation".

His scheme was to have two foundations, one built into the ground in the usual manner and another fixed to the bottom of the building.

Between the two would be a series of springs which would carry the weight but allow motion to be absorbed via an array of dampers.

"We want to give the building a soft ride," Skinner said.

He put the mathematical theory in place and relied on people like technician Arnold Heine to come up with the prototype dampers.

All that was required at that stage in the 1970s was a real life project to work on.

It materialised in the form of the Mangaweka-to-Utiku railway deviation which opened on the North Island's main trunk line in 1981.

The new route included the South Rangitikei Viaduct, which incorporated one of Skinner's special design creations.

The viaduct was built of five twin-shafted piers carrying pre-stressed concrete beams. At 78 metres high, and 315m long, it included for the first time energy-absorbing dampers in the foundations of the piers.

If an earthquake hit, the piers were designed to step from side to side, but not collapse.

New Zealand Railways had put the bridge out to design-build tender and consulting engineers came up with a design that was subsequently adapted to incorporate Skinner's "stepping



Big shakes: Ivan Skinner came up with the idea of "base isolation" to protect buildings from earthquakes.

action" into the pier design concept.

In coming up with the design, Skinner needed a means of testing prototype dampers to be used in the viaduct construction.

Skinner and his colleagues at the DSIR's Gracefield Physics and Engineering Laboratory in Lower Hutt had a working relationship with many senior Ministry of

Works engineers who willingly made an old Caterpillar D8 bulldozer available to the scientists for their research. The machine was housed in one of the wooden sheds built by the US Marine Corps in 1942 at Gracefield.

At the time of the first Gracefield prototype test, Cam Smart drove the big D8 Cat out on to the scaled-down viaduct construction model.

Skinner, Smart and the team knew they were on to a winner when a key prototype beam twisted back and forth as if it were made of plasticine under the swivelling weight of the bulldozer.

The laboratory head in those days was Dr Mervyn Probine, who would later become State Services commissioner.

He readily approved Smart's suggestion the earthquake scientists should adjourn to Lower Hutt's Bellevue Hotel to celebrate the success of the trial.

Amidst the Bellevue Hotel afternoon euphoria, Skinner realised a Japanese seismologist, who had been working with Skinner at Gracefield, had conscientiously attended to his own work and had not witnessed

the successful significant "base prototype" test.

"Where's Dr Kittigawa?" Skinner asked.

Realising he was not at the hotel, celebrating the bulldozer test experiment, Skinner drove his car back to the DSIR laboratory to collect his Japanese guest.

IT WAS no coincidence that, as his career with the DSIR developed and his earthquake research reputation grew, Skinner was often seconded to the United Nations Educational, Scientific and Cultural Organisation for stints as an earthquake engineering expert, including 20 months at the International Institute for Seismology and Earthquake Engineering in Japan from early 1969.

Skinner spent two months at an earthquake institute in Yugoslavia in 1973, worked on setting up an earthquake research institute in Greece and went on lecture visits and tours to Mexico (1972) and China (1985).

Unesco also supported Skinner's engineering studies of several destructive earthquakes, including two that damaged Manila in the Philippines in 1968

and 1970. Other engineering studies were undertaken in Rabaul (Papua New Guinea) in 1967 and Caracas (Venezuela) also in 1967.

The World Conference on Earthquake Engineering is held every four years. Skinner attended 11 out of 13 of these over a 48-year period.

He was the Earthquake Commission's (EQC) research director from 1994 to 2005, sponsoring many of that organisation's far-sighted investments in research and education to improve New Zealand's understanding and management of natural hazard risk.

The humble man who grew up on a farm at Tuapeka Mouth near the Clutha River, looking after bees and sheep, is remembered in the earthquake engineering community as a gentleman, first-rate researcher, administrator, mentor and friend.

He died suddenly in Brisbane while visiting his daughter Julian Skinner's Queensland home.

He was a cousin of All Black legend Kevin Skinner and renowned West Coast poet Eileen Duggan, who lived at Imperial Terrace

in Kilmuir.

Skinner's memory is perpetuated via the annual Earthquake Commission (EQC) and New Zealand Society for Earthquake Engineering (NZSEE) "Ivan Skinner Award," which has a value of \$10,000.

The aim of the award is to advance the common interest of the EQC and NZSEE to promote research aimed at reducing the impacts of earthquakes on Kiwi communities.

Skinner was made a Fellow of the Royal Society of New Zealand in 1977, a Fellow of the New Zealand Society for Earthquake Engineers in the mid-1980s and in 1990 received the Queen's Medal for "services to New Zealand".

TIM DONOGHUE

Sources: Patricia Witham, Win Clarke, Richard Sharpe, Hugh Cowan, Cam Smart, Graeme McVerry, Jo Martin, EQC and NZSEE.

A Life Story tells of a New Zealander who helped to shape their community. If you know of someone whose life story should be told, please email obituaries@dompost.co.nz.